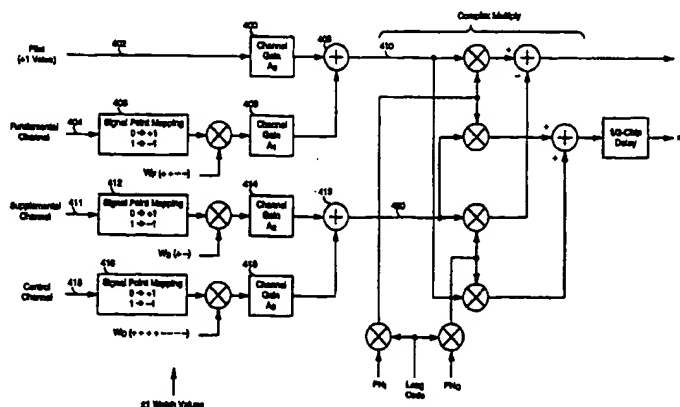




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : <b>H04B 1/707, H04L 1/00</b>	<b>A3</b>	(11) International Publication Number: <b>WO 98/52365</b> (43) International Publication Date: 19 November 1998 (19.11.98)
<p>(21) International Application Number: PCT/US98/09868</p> <p>(22) International Filing Date: 13 May 1998 (13.05.98)</p> <p>(30) Priority Data: 08/856,428 14 May 1997 (14.05.97) US</p> <p>(71) Applicant: QUALCOMM INCORPORATED [US/US]; 6455 Lusk Boulevard, San Diego, CA 92121 (US).</p> <p>(72) Inventor: ODENWALDER, Joseph, P.; 14967 Rancho Real, Del Mar, CA 92014 (US).</p> <p>(74) Agents: OGROD, Gregory, D. et al.; Qualcomm Incorporated, 6455 Lusk Boulevard, San Diego, CA 92121 (US).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report.</p> <p>(88) Date of publication of the international search report: 4 February 1999 (04.02.99)</p>	

(54) Title: SUBSCRIBER UNIT PLURAL CONTROL AND DATA SOURCES FOR CDMA WIRELESS COMMUNICATION SYSTEM



## (57) Abstract

A set of individually gain adjusted subscriber channels (402, 404, 411, 415) are formed via the use of a set of orthogonal subchannel codes ( $W_c$ ,  $W_s$ ,  $W_f$ ) having a small number of PN spreading chips per orthogonal waveform period. Data to be transmitted via one of the transmit channels is low code rate error correction encoded and sequence repeated before being modulated with one of the subchannel codes, gain adjusted, and summed with data modulated using the other subchannel codes. The resulting summed data (410, 420) is modulated using a user long code and a pseudorandom spreading code (PN code) and upconverted for transmission. The use of the short orthogonal codes provides interference suppression while still allowing extensive error correction coding and repetition for time diversity to overcome the Raleigh fading commonly experienced in terrestrial wireless systems. The set of sub-channel codes may comprise four Walsh codes, each orthogonal to the remaining codes of the set. The use of four sub-channels is preferred as it allows shorter orthogonal codes to be used, however, the use of a greater number of channels and therefore longer codes is acceptable. Preferably, pilot data is transmitted via a first one of the transmit channels and power control data transmitted via a second transmit channel. The length, or number of chips, in each channel code may be different to further reduce the peak-to-average transmit power for higher rate data transmission.

*FOR THE PURPOSES OF INFORMATION ONLY*

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakhstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/09868

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 H04B1/707 H04L1/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 H04B H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>WO 95 03652 A (QUALCOMM INC) 2 February 1995 see abstract see page 8, line 32 - page 9, line 15 see page 9, line 33-39 see page 11, line 14-26 see page 12, line 16-39 see page 16, line 33 - page 17, line 28</p> <p style="text-align: center;">--- -/-</p>	1-15

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

17 November 1998

Date of mailing of the international search report

23/11/1998

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Toumpoulidis, T

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 98/09868

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 103 459 A (GILHOUSEN KLEIN S ET AL) 7 April 1992 cited in the application see abstract see column 5, line 63 - column 6, line 50 see column 11, line 35-56 see column 18, line 44 - column 19, line 10 see claims 1,2,4,12,21,22 see figures 4A,,4B,,4C ----	1-15
A	US 5 329 547 A (LING FUYUN) 12 July 1994 see abstract see column 7, line 5-49 see claims 1-3,26 see figure 1 ----	1-15
A	US 4 901 307 A (GILHOUSEN KLEIN S ET AL) 13 February 1990 cited in the application see column 5, line 17-60 see column 6, line 54 - column 7, line 4 see column 8, line 16-30 see claims 1,2 see figure 15 ----	1-15
P,X	WO 97 45970 A (QUALCOMM INC) 4 December 1997 see the whole document ----	1-15
P,X	WO 97 47098 A (QUALCOMM INC) 11 December 1997 see the whole document -----	1-15

BEST AVAILABLE COPY

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 98/09868

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9503652 A	02-02-1995	AU 7368294 A US 5751761 A ZA 9405260 A	20-02-1995 12-05-1998 27-02-1995
US 5103459 A	07-04-1992	AU 652956 B AU 8401691 A BG 61514 B BG 97222 A CA 2085890 A CN 1061312 A CZ 283123 B EP 0536334 A FI 925812 A HU 64657 A IL 98598 A JP 6501349 T MX 173818 B PT 98079 A SK 387192 A WO 9200639 A US 5511073 A US 5715236 A US 5504773 A US 5659569 A US 5535239 A US 5629955 A US 5568483 A US 5416797 A US 5309474 A	15-09-1994 23-01-1992 31-10-1997 27-05-1994 26-12-1991 20-05-1992 14-01-1998 14-04-1993 21-12-1992 28-01-1994 27-02-1994 10-02-1994 29-03-1994 31-08-1993 10-08-1994 09-01-1992 23-04-1996 03-02-1998 02-04-1996 19-08-1997 09-07-1996 13-05-1997 22-10-1996 16-05-1995 03-05-1994
US 5329547 A	12-07-1994	CA 2134230 A CN 1105510 A EP 0643889 A FI 945336 A JP 7506713 T PL 306002 A SE 9403860 A SG 46295 A WO 9421065 A	15-09-1994 19-07-1995 22-03-1995 11-11-1994 20-07-1995 20-02-1995 27-12-1994 20-02-1998 15-09-1994

BEST AVAILABLE COPY

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 98/09868

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4901307 A	13-02-1990	AT 121243 T	15-04-1995
		AU 600528 B	16-08-1990
		AU 7987687 A	21-04-1988
		CA 1294074 A	07-01-1992
		DE 3751232 D	18-05-1995
		DE 3751232 T	24-08-1995
		EP 0265178 A	27-04-1988
		ES 2070824 T	16-06-1995
		GR 3015768 T	31-07-1995
		JP 2763099 B	11-06-1998
		JP 63108827 A	13-05-1988
WO 9745970 A	04-12-1997	AU 3154697 A	05-01-1998
WO 9747098 A	11-12-1997	AU 3306497 A	05-01-1998

BEST AVAILABLE COPY